

ECP 2011

2nd European Conference on Polygeneration

Technologies and Perspectives

Palau Firal i de Congressos
Tarragona, Spain

March 30th – April 1st, 2011


www.polygeneration.net

Organisation by

Universitat Rovira i Virgili

CREVER

Introduction

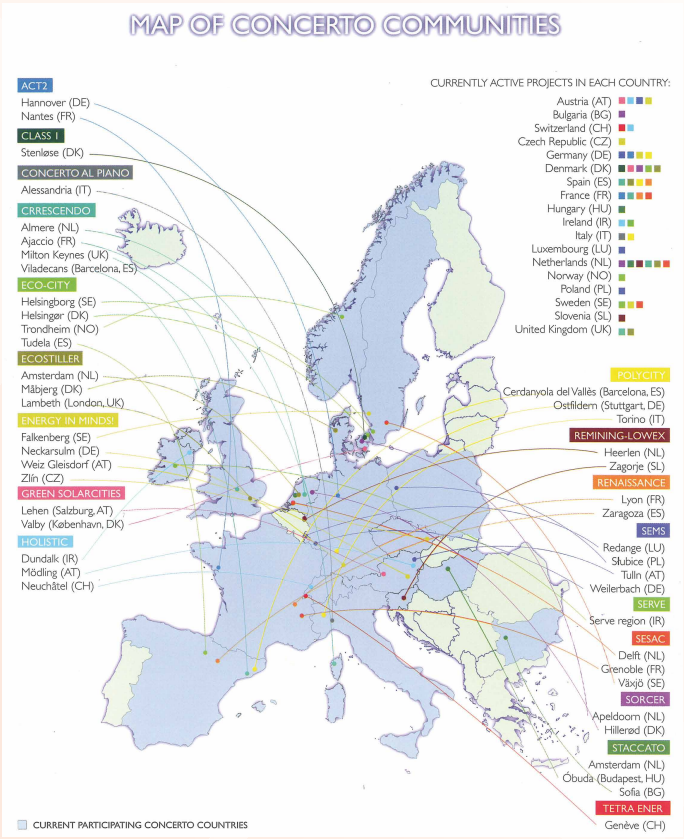
Energy and the environment are two crucial issues for the world's sustainable development. At present the global economy is heavily dependent on the supply of crude oil, which is limited and associated with different kinds of environmental and strategic risks. Development of efficient new technologies using renewable energy sources is one of the key issues for sustainable growth of modern societies for the future. Polygeneration is a relatively new concept which has the potential to improve the efficiency of energy supply systems, while at the same time integrate seamlessly with the use of renewable energy sources for the delivery of the required energy in buildings or industries.

Polygeneration is the central topic of this conference and refers to the combined production of electricity with heat, cold and other useful products as it includes conventional cogeneration, trigeneration, as well as technologies for producing fuels and other value-added products such as potable water.

Conference Focus

The 2nd Polygeneration Conference is organized in the framework of the EU Research and Demonstration project named POLYCITY, to share the knowledge and results of the different CONCERTO projects and to promote discussion and exchange between scientists, industry and users of efficient products and technologies not only from Europe, but also from all over the world.

The CONCERTO initiative, launched by the European Commission, is a Europe-wide initiative proactively addressing the challenges of encouraging the development of sustainable cities through the implementation of innovative technologies, and set the foundations for a more sustainable European energy policy. The projects are realised over defined



geographical areas and concentrate on both innovative technologies and on innovative technology mixed approaches. They put a strong emphasis on the integrative approach to achieve solutions which most effectively reduce CO_2 emissions in the best economical way.

We hope that this conference will continue the success of the previous conference in 2007 and contribute to the international exchange of new ideas and projects on polygeneration technologies able to reach the goals of the future for clean and energy efficient technologies.

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Conference Chairman

A. Coronas
CREVER, Universitat Rovira i Virgili, Tarragona, Spain

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Kyushu University, Fukuoka, Japan

S. Srinivasa Murthy
Indian Institute of Technology Madras, Chennai, India

Local Committee

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J. Ortiga, CREVER, Universitat Rovira i Virgili, Tarragona, Spain

M. Puig-Arnavat, CREVER, Universitat Rovira i Virgili, Tarragona, Spain

OPENING SESSION

Chairman: Alberto Coronas

14:00 h WELCOME AND INAUGURATION

14:20 h When Intermittent Power Production Serves Transient Loads "The Art of the Possible" (ABS 48)
Horacio Perez-Blanco, Department of Mechanical Engineering, The Pennsylvania State University, USA

14:45 h Imperatives for combined energy generating devices for enhancing fossil fuel resource and integration with renewable energy resource for a seamless transition from fossil to renewable energy resources: Concept of Virtual Power (ABS 15)
RR Sonde, Research Technology Innovation Center, THERMAX LTD., Pune (India)

15:10 h High efficiency trigeneration systems for buildings (ABS 49)
Reinhard Radermacher, Center for Environmental Energy Engineering, University of Maryland, Maryland (USA)

15:35 h Adequate incentive-schemes for polygeneration technologies - possibilities & practical experiences (ABS 36)
Alois Kraussler, Department of Energy, Transport & Environmental Management, University of Applied Science FH Joanneum, Kapfenberg (Austria)

16:00 h **COFFEE BREAK**

POLYGENERATION SYSTEMS AND TECHNOLOGIES

Chairman: S. Srinivasa Murthy

16:30 h	The EC REMINING-lowex project in Heerlen, the Netherlands: development from a geothermal to a polygeneration concept (ABS 01) **Peter Op 't Veld**, Cauberg-Huygen Consulting Engineers, Maastricht (Netherlands)
16:55 h	Parc de l'Alba: sustainable urban development in Cerdanyola del Vallès using a high efficiency trigeneration system and a district heating and cooling network (ABS 59) **Francesc Figueres**, Parc de l'Alba, Cerdanyola del Vallès (Spain)
17:30 h	Biomass trigeneration with decentral cooling by distric heating networks (ABS 55) **Ursula Eicker**, Stuttgart University of Applied Sciences, Zaft.net, Stuttgart (Germany)
17:55 h	Experimental assessment of a small-scale trigeneration plant with a natural gas microturbine and a liquid desiccant system (ABS 37) **Mauro Ferrero**, Dipartimento di Energetica, Politecnico di Torino, Turin (Italy)
18:20 h	Performance evaluation of integrated trigeneration and CO_2 refrigeration system (ABS 47) **Savvas A. Tassou**, School of Engineering and Design , Brunel University, Uxbridge (UK)
18:45 h	The Forest Biorefinery and its Implementation in the Pulp & Paper Industry (ABS 03) **Jean Paris**, Departement of chemical engineering, École Polytechnique de Montréal, Montréal, Quebec (Canada)

POLYGENERATION TECHNOLOGIES BASED ON SOLAR ENERGY

Chairman: Horacio Perez Blanco

9:00 h — Solar heat for industrial processes - the challenge of system integration (ABS 52)
Klaus Hennecke, Institut für Technische Thermodynamik, DLR - German Aerospace Center, Stuttgart (Germany)

9:20 h — Experimental validation of an optical and thermal model of a Linear Fresnel Collector (ABS 22)
Francisco Javier Pino, Grupo de Termotecnia. Departamento de Ingeniería Energética, Universidad de Sevilla, Sevilla (Spain)

9:40 h — Design of a facility for testing expansion machines for small scale CSP and first test results (ABS 64)
Thomas Fluri, Department Solar Thermal and Optics, Fraunhofer Institute for Solar Energy Systems ISE, Freiburg (Germany)

10:00 h — Valorization of low-temperature heat: impact of the heat sink on performance and economics (ABS 54)
Felix Ziegler, Institute of Energy Engineering, Technische Universität Berlin, Berlin (Germany)

10:20 h — The potential of medium scale solar thermal power and solar polygeneration (ABS 63)
Thomas Fluri, Department Solar Thermal and Optics, Fraunhofer Institute for Solar Energy Systems ISE, Freiburg (Germany)

10:40 h Building integration of concentrating systems for solar cooling applications (ABS 13)
Daniel Chemisana, Enviromental Sciences Department, Universitat de Lleida, Lleida (Spain)
Jesús López, CREVER, Universitat Rovira i Virgili, Tarragona (Spain)

11:00 h **COFFEE BREAK**

POLYGENERATION SYSTEMS FOR WATER SUPPLY

Chairman: Bidyut Baran Saha

11:30 h Solar-assisted adsorption cycle for the production of cooling effect and potable water (ABS 08)
Kim Choon Ng, Department of Mechanical Engineering, National University of Singapore, (Singapore)

12:00 h Assessment of suitable configurations for combined Solar Power and Desalination plants (ABS 25)
Julián Blanco, Ciemat- Plataforma Solar de Almería, Almería (Spain)

12:20 h A novel cogeneration system consisting of a proton exchange membrane fuel cell coupled to a heat transformer for electricity, heat and distillation purposes (ABS 11)
Wilfrido Rivera, Centro de Investigación en Energía, Universidad Nacional Autónoma de México, Texmico (México)

12:40 h Energy Networks in Sustainable Cities: Polycity Project and the Case Study of Turin-Arquata (ABS 44)
Paolo Lazzeroni, Dipartimento di Ingegneria elettrica, Politecnico di Torino, Turin (Italy)

13:00 h **LUNCH**

COGENERATION AND TRIGENERATION
TRIGENERATION - GENERAL CONCEPTS

Chairman: S. Srinivasa Murthy

14:30 h Development of cogeneration and district energy (CDE) networks in South-East Asia (ABS 53)
Brahmanand Mohanty, Asian Institute of Technology, Bangkok (Thailand)

14:50 h Sizing of thermal energy storage devices for micro-cogeneration systems for domestic hot water preparation. Theory and experimental results (ABS 16)
José I. Linares, Universidad Pontificia Comillas, Madrid (Spain)

15:10 h District heating and cooling for business buildings in Madrid (ABS 30)
Pedro Rodriguez, Departamento de Ingeniería Térmica y de Fluidos. Grupo ITEA, Universidad Carlos III, Madrid (Spain)

15:30 h Control strategies for heat driven chillers to reduce parasitic electric consumption (ABS 45)
José Luis Corrales, Institute of Energy Conversion Machines, Technische Universität Berlin, Berlin (Germany)

15:50 h Synthesis and design of a polygeneration scheme for the tourist sector: comparison of the Spanish and Italian conditions (ABS 29)
Javier Uche, CIRCE Institute, Universidad de Zaragoza, Zaragoza (Spain)

16:10 h **COFFEE BREAK**

COGENERATION AND TRIGENERATION
TRIGENERATION - TECHNOLOGIES

Chairman: Roberto Best

16:40 h	Possibility and constraints of ozone friendly working fluids for adsorption refrigeration and gas storage systems (ABS 50) **Bidyut Baran Saha**, Department of Mechanical Engineering, Kyushu University, Fukuoka (Japan)
17:00 h	Part load characteristics of Organic-Rankine-Cycles (ABS 07) **Tobias Erhart**, Stuttgart University of Applied Sciences, zaft.net, Stuttgart (Germany)
17:20 h	Energy assessment of the heating-mode operation of a solar assisted absorption ground coupled heat pump (ABS 10) **Andrés Macía**, Centro Tecnológico CARTIF, Valladolid (Spain)
17:40 h	Simulation studies on GAX based Kalina cycle for both power and cooling applications (ABS 14) **Rajagopal Saravanan**, Refrigeration and Airconditioning Laboratory, Dept. of Mechanical Engineering, Anna University, Chennai (India)
18:10 h	Turn waste heat into electricity by using an Organic Rankine Cycle (ABS 39) **Bruno Vanslambrouck**, Electromechanics Department, Research Group of Thermodynamics, Howest, University College of West-Flanders, Kortrijk (Belgium)
18:30 h	An Analysis of Coupled PEM Fuel cell - Metal Hydride Hydrogen Storage Tank System (ABS 57) **G. Venkatarathnam**, Refrigeration and Airconditioning Laboratory - Dep. of Mechanical Engineering, Indian Institute of Technology Madras, Chennai (India)
21:00 h	**CONFERENCE DINNER:** **HOTEL HUSA IMPERIAL TARRACO**

POLYGENERATION TECHNOLOGIES BASED ON BIOMASS

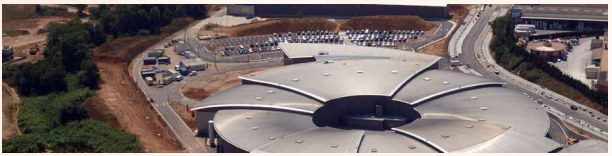
Chairman: Ursula Eicker

9:00 h	Biomass gasification cogeneration (ABS 61) **Jesper Ahrenfeldt**, Biomass Gasification Group, National Laboratory for Sustainable Energy - Risø DTU, Roskilde (Denmark)
9:20 h	Polygeneration of Hydrogen from Biomass Using Electrochemical Reforming (ECR) (ABS 04) **Joseph Maceda**, Gibbs Energy, LLC, Newark (USA)
9:40 h	Methods to improve the performance of fluidized bed biomass gasifiers (ABS 20) **Alberto Gómez-Barea**, Chemical and Environmental Engineering Department, Universidad de Sevilla, Sevilla (Spain)
10:00 h	Multi-objective optimization of biomass conversion technologies by using evolutionary Algorithm and Mixed Integer Linear Programming (MILP) (ABS 21) **Samira Fazlollahi**, Ecole Polytechnique Federale de Lausanne, Lausanne (Switzerland)
10:20 h	Analysis and optimization of a cogeneration system based on biomass combustion (ABS 33) **Rafal Strzalka**, Stuttgart University of Applied Sciences, zaft.net, Stuttgart (Germany)
10:40 h	Syngas from Glivcerin by Electric Arc (ABS 43) **Gilberto Carrillo**, Grupo de Investigación GISEL, Universidad Industrial de Santander, Bucaramanga (Colombia)
11:00 h	Planning of a quadgeneration power plant for Jammerbugt energy system (ABS 66) **Souman Rudra**, Department of Energy Technology, Aalborg University, Aalborg (Denmark)
11:20 h	**COFFEE BREAK**

TRIGENERATION - OPTIMIZATION

Chairman: Joan Carles Bruno

11:50 h	High efficiency Trigeneration systems in integrated energy systems (ABS 51) **François Marechal**, Ecole Polytechnique Federale de Lausanne, Lausanne (Switzerland)
12:10 h	Multiobjective optimization of trigeneration systems considering economic and environmental aspects (ABS 02) **Monica Carvalho**, Group of Thermal Engineering and Energy Systems (GITSE), Universidad de Zaragoza, Zaragoza (Spain)
12:30 h	Simulation and optimization of the district heating network in Scharnhauser Park (ABS 09) **Ilyes Ben Hassine**, Stuttgart University of Applied Sciences, Zaft.net, Stuttgart (Germany)
12:50 h	Optimization of a distributed trigeneration system with heating micro-grids for an industrial area (ABS 27) **Mauro Reini**, Dept. of Mechanical and Naval Engineering, University of Trieste, Triste (Italy)
13:10 h	**CLOSING CEREMONY**
14:00 h to 19:00 h	**SITE VISIT (optional*):** **ST-4 POLYGENERATION PLANT,** Cerdanyola del Vallès, Barcelona (Spain)



*The site visit has no extra cost but you have to be registered. Please, if you are interested in attending the site visit, register through the Conference website (www.polygeneration.net). Lunch will be provided to the attendees.

Posters

Solar Cooling in the agro-food industries in México, a case study (ABS 18)
Roberto Best, Centro de Investigación en Energía, Universidad Nacional Autónoma de México, Texmico (México)

Domestic Solar Water Heating Systems in Kuwait: Merits and Drawbacks (ABS 05)
Ahmad Alotaibi, Department of Building and Energy Technologies, Kuwait Institute for Scientific Research, Safat (Kuwait)

Trigeneration solar simulation using different types of hybrid panels (ABS 34)
Alejandro del Amo, Centro Politécnico Superior/GEE, Universidad de Zaragoza, Zaragoza (Spain)

Experimental analysis of a water purification system by using a heat transformer with carrol-water solution (ABS 19)
Javier Siqueiros, Centro de Investigación en Ingeniería y Ciencias Aplicadas (CIICAp), Universidad Autónoma del Estado de Morelos, Morelos (México)

Combined generation of electricity, space-cooling and water desalination from solar heat at 200ºC
Guillermo Zaragoza, Ciemat- Plataforma Solar de Almería, Almería (Spain)

An inverse neural network is an alternative to optimal performance in polygeneration systems (ABS 35)
Alfredo Hernández, Centro de Investigación en Ingeniería y Ciencias Aplicadas (CIICAp), Universidad Autónoma del Estado de Morelos, (México)

Agroindustrial renewable energy engineering: an approach from functional analysis (ABS 42)
Gilberto Carrillo, Grupo de Investigación Gisel, Universidad Industrial de Santander, Bucaramanga (Colombia)

Performance Analysis of a Biomass ORC Poly-generation Systems (ABS 06)
Tobias Erhart, Stuttgart University of Applied Sciences, Zaft.net, Stuttgart (Germany)

Thermodynamic analysis of a trigeneration system consisted of a gas microturbine and a double effect air conditioning system
Wilfrido Rivera, Centro de Investigación en Energía, Universidad Nacional Autónoma de México, Texmico (México)

Efficiency increase in cogeneration internal combustion engines through waste heat recovery by means of an organic Rankine Cycle (ABS 17)
José I. Linares, Universidad Pontificia Comillas, Madrid (Spain)

Simulation of an integrated hydrogen fuel cell with NH_3-water absorption system for combined production of electricity, cooling/heating and hot water (ABS 24)
Jaime Sieres, Área de Máquinas y Motores Térmicos - ETSII, Universidad de Vigo, Vigo (Spain)

Trigeneration with micro-CHP and Absorption cooling for the residential sector in Mediterranean climate (ABS 26)
Juan Francisco Belmonte, Instituto de Investigación en Energías Renovables - ENERSYS, Universidad de Castilla - La Mancha, Albacete (Spain)

Seasonal Thermal Energy Storage: a strategic technology for cogeneration systems (ABS 28)
Maider Epelde, Tecnalia, Azpeitia (Spain)

Operational Optimisation of a Complex Trigeneration System Connected to a District Heating and Cooling Network (ABS 31)
Jordi Ortiga, CREVER - Group of Applied Thermal Engineering, Universitat Rovira i Virgili, Tarragona (Spain)

Refrigeration using recovered waste heat in fishing vessels: Potential application and case study (ABS 32)
Joan Carles Bruno, CREVER - Group of Applied Thermal Engineering, Universiat Rovira i Virgili, Tarragona (Spain)

Automatic selection of typical demand days for CHP optimization (ABS 38)
Fernando Domínguez, Energy Research Group, Universidad de Málaga, Málaga (Spain)

Efficiency comparison between the steam cycle and the organic Rankine cycle for small scale power production (ABS 40)
Bruno Vanslambrouck, Electromechanics Department, Research Group of Thermodynamics, Howest, University College of West Flanders, Kortrijk (Belgium)

Subcooled boiling of ammonia-lithium nitrate solution in a plate generator (ABS 41)
Ciro Vereda, Departamento de Ingeniería Térmica y de Fluidos, Universidad Carlos III, Madrid (Spain)

Ideas for the use fuel cells, solar energy and wind power to satisfy the air conditioned, the propulsion and the electric energy on maritime and river boats (ABS 56)
Bienvenido Sarria, Universidad Tecnológica de Bolívar, Cartagena de Indias, (Colombia)

Heat and mass transfer based studies on silica gel-water solid sorption cooling systems (ABS 58)
S. Srinivasa Murthy, Refrigeration and Airconditioning Laboratory - Dep. of Mechanical Engineering, Indian Institute of Technology Madras, Chennai (India)

Modelling and validation of a large-scale solar cooling plant considering dynamic behaviour of the solar collectors
Jesús López Villada, CREVER - Group of Applied Thermal Engineering, University Rovira i Virgili, Tarragona (Spain)

Modeling and energetic performance simulation of a cogeneration system model (ABS 65)
Javier Biosca, Instituto de Ingeniería Energética, Grupo Simes, Universidad Politécnica de Valencia, Valencia (Spain)

Design of an air-cooled solar power Stirling engine under the concept of distributed generation
Ricardo Beltrán, Instituto de Ingeniería Centro de Estudio de las Energías Renovables, Universidad Autónoma de Baja California, (México)

Combined production of Cooling and Distilled Water on Cruise Ships
Jürgen Scharfe, Inven Absorption Gmbh, Erding (Germany)

Conference venue

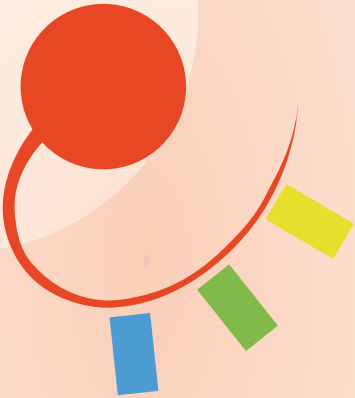
Palau Firal i de Congressos, Tarragona, Spain
Arquitecte Rovira, 2
43001 Tarragona

Conference registration

Via the website: www.polygeneration.net

Conference dinner

HOTEL HUSA IMPERIAL TARRACO
Passeig de les Palmeres s/n
43003 Tarragona



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